

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

WASTE TREATMENT

(Number)

CODE 629

DEFINITION

The use of unique or innovative mechanical, chemical or biological technologies that change the characteristics of manure and agricultural waste.

PURPOSE

To use manure and waste treatment facilities to improve water quality and air quality by:

- Reducing the nutrient content, organic strength, and/or pathogen levels of manure and agricultural waste.
- Reducing odors and gaseous emissions
- Facilitating desirable waste handling and storage
- Producing value added byproducts that facilitate manure and waste utilization.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where there is a need to implement waste treatment technologies that are not within the scope of other NRCS Conservation Practice Standards and that are sufficiently developed for incorporation into a manure or agricultural waste management system. This includes new or unique components or processes.

General Criteria Applicable to All Waste Treatment Purposes.

Laws and Regulations. Ensure that the manure and waste treatment facilities and processes are planned, designed, and constructed to meet all federal, state, and local laws and regulations.

Utilities. Locate all buried utilities in the project area including drainage tile and other structural measures.

Design. The waste treatment technology provider shall complete and supply to the land owner/operator a detailed design of the facility/process clearly identifying the objectives and anticipated outcomes of implementation.

When the planned technology involves a system or process include in the design documentation a process diagram containing, at a minimum, the following information:

1. Volumetric flow rates including influent, effluent, and recycle streams.
2. Waste load projections including volume, mass, and characteristics of the waste important to the waste treatment facility or process.
3. Unit process volumes and hydraulic retention times where appropriate.
4. Air emissions projections from the system.
5. Nutrient fate projections within the system.
6. Process monitoring and control system requirements as described below in the Monitoring section of the criteria.

It is the responsibility of the technology provider to furnish information from a university or other independent research entity to document the effectiveness of the technology to achieve its intended purpose. Provide independent, verifiable data demonstrating results of the use of the facility or process in other similar situations and locations. If available document the effectiveness of the technology under different climatic factors. Documentation from peer reviewed journals is

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service [State Office](#) or visit the [electronic Field Office Technical Guide](#).

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preferable. Where use of a waste treatment facility or process to improve one resource concern negatively impacts another, impacts and mitigation measures, if required by state or local agencies, are to be documented.

Components. Waste treatment facilities and processes may consist of multiple components. Where criteria for individual components are described in existing NRCS practice standards, use those practice standards and their specific criteria for planning, designing, and installation of that component.

Where components of a facility or process are not described in a current NRCS practice standard, the system provider shall furnish a minimum one year warranty on all construction, equipment, and applied processes.

All precast concrete materials shall be constructed in accordance to ASTM C913 – “Precast Concrete Water and Wastewater Structures. All other materials shall conform to the applicable ASTM specifications. Components shall be suitable for the site conditions. These conditions include vehicular traffic and soils loads, corrosion of materials, floatation of tanks, and frost action.

Expected System Performance. Clearly document the expected system performance prior to system installation. At a minimum, document all expected system volumetric flow rates, macro-nutrient reductions or changes in form, expected pathogen reductions, gaseous ammonia and hydrogen sulfide emissions reductions (or increases).

Operating Costs. The system provider shall furnish an annual estimate of operating costs and the time, labor, energy, and equipment requirements for each waste treatment component of the waste management system and on the operation cost or savings the waste treatment component will have on the waste management system as a whole. Identify as estimates the operating costs not based on actual data. Adequately document the anticipated operation cost or savings of the waste treatment component on the entire system.

Monitoring. Install as a part of the system equipment needed to properly monitor and control the waste treatment facility or process.

Identify the process control parameters to be monitored in the design documentation. Identify parameters considered critical to proper system operation in the Operation and Maintenance (O&M) Plan. Monitor critical equipment status and unit processes.

Byproducts. Implementation of a waste treatment process or operation of a waste treatment facility shall not result in discharge of byproducts harmful to the environment.

Handle and store all byproducts in such a manner as to prevent nuisances to neighbors or to the public at large.

The land application of byproducts to supply plant nutrients must meet the criteria in NRCS Conservation Practice Standard 590, Nutrient Management.

Handle and dispose of any unmarketable or unused byproducts in accordance with all applicable federal, state, and local laws and regulations. A plan for dealing with such byproducts shall be prepared and approved prior to utilization of the process or installation of the waste treatment facility, and shall include a listing of any permits or permissions required for the execution of the plan.

Recycle the waste treatment byproducts to the extent possible without causing a hazard to the environment.

Safety. Include the design of the process or facility safety features to minimize hazards. Provide guards and shields for moving parts of the equipment used in the treatment process. Fence waste treatment facilities and post warning signs where needed to prevent children and others from entering a hazardous area.

Carry out all treatment processes in accordance with all safety regulations. Wear protective clothing when handling potentially harmful chemicals that may be used in the process. Provide proper ventilation.

Additional Criteria Applicable to Milkhouse Wastewater Infiltration Areas

This practice is intended for milkhouse wastewater from small dairy operations where the anticipated flow is ≤ 350 gallons per day. Manure from the animals shall be excluded from the system. This practice does not apply

when it is practical and reasonable to add the wastewater to the waste storage facility.

This practice shall be located and designed using procedure shown in the Agricultural Waste Management Field Handbook (AWMFH), Chapter 10, Section 651.1004(k), Amendment VT-1, "Milkhouse Wastewater Infiltration Area".

Air Trap. An air trap shall be installed in the distribution pipeline. The purpose is to prevent gases from entering the milking center.

Air Vent. Air vents shall be installed where needed to maintain atmospheric pressure in the system. Odors may be prevalent from air vents.

Pipeline. For gravity systems the pipeline shall be PVC pipe shall be used a minimum inside diameter of 4 inches. Minimum slope for gravity pipelines shall be 1 percent. Pipe for pump systems shall meet the pump manufacturer's specifications for size and pressure rating. Clean out access to the pipe line shall be provided at every deflection greater than 45 degrees, high points, and low points in the profile and at intervals not exceeding 100 feet. Pipe shall be located at an adequate depth or otherwise protected to avoid damage from vehicles and frost.

Settling Tank. A settling tank shall be used to trap heavy solids.

A grease trap shall be used to remove milk fats, grease, and other floatable solids.

The combined capacity of the solid and grease traps shall be a minimum of six (6) times the actual daily flow. The settling tank and grease trap shall be water tight, designed not to float and be accessible year-round for periodic clean out. Clean out ports shall have risers and covers for accessibility and safety.

Effluent filter. A minimum of one effluent filter shall be installed at the outlet end of the grease trap. The maximum size opening of the filter shall be 1/32 inches and shall be designed to handle the anticipated flow rate. This filter shall be removable for periodic cleaning and maintenance.

Pump. If necessary a pump station shall be installed to transfer wastewater from the wastewater source to the settling basin. The settling basin and grease trap shall be located

to provide gravity feed to the disposal field. Pumping wastewater directly to the disposal field will not be allowed. This standard does not address or provide criteria for pressurized disposal fields. A standard sanitary pumping station is recommended. The pump station shall have a riser and cover for year-round accessibility and safety. The pump shall be solids handling type sewage pump designed to handle the anticipated flow rate and hydraulic head.

Distribution Box. A distribution box shall be used to distribute the effluent evenly throughout the disposal field. In a single linear terraced disposal fields, the distribution box is not needed, but encouraged to allow access to pipes.

Disposal Field. A site investigation is required to locate the disposal field. The disposal field should be located as far as practical from water sources, property lines, and other resource concerns. See AWMFH, Amendment VT-1, Table 1 for minimum isolation distances from any edge of the disposal field.

A soil investigation, with at least one soil observation describing the representative soil profile, is needed to size and locate the disposal field. Select the soil profile shown in Table 2 of the AWMFH, Amendment VT-1, which best describes the soil on site to design the system. If possible a soil scientist should conduct this investigation.

Soils that are in Design Class 2 or 3 as defined in Table 3 of the AWMFH, Amendment VT-1, must be modified to protect the groundwater.

Exclude all surface and subsurface water from the disposal field.

Fence. Fence around the disposal field as necessary to exclude equipment and animals.

CONSIDERATIONS

Location. Locate the waste treatment facility as near the source of manure or other waste as practicable and as far from neighboring dwellings or public areas as possible. For proper location also consider slope, distance of manure and other waste transmission, vehicle access, wind direction, proximity of streams and flood plains, and visibility.

In determining the location of the facility, consider elevation and distance from various components to take advantage of gravity flow where possible.

Manure Characteristics. Waste treatment may require specific total solids and nutrient contents of the waste stream. Pretreatment options such as dilution or settling could be used to adjust the solids content before entering the waste treatment facility or process.

Visual Screening. Evaluate the visual impact of the waste treatment facility or process within the overall landscape context. Look at implementing screening with vegetative plantings, landforms, or other measures to alleviate a negative impact or enhance the view.

Milkhouse Wastewater Infiltration Area. Whenever possible, the first flush, when washing the milking system, should be diverted away from the infiltration system and used to feed the livestock.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for waste treatment facilities in accordance with the criteria of this standard and good engineering practice.

As a minimum, provide the following in the plans and specifications:

1. Layout and installation details of livestock facilities, waste collection points, waste transfer components, waste treatment and storage facilities, including supporting documentation.
2. Location of all inflow and discharge pipelines, pipeline materials, diameter and slope.
3. Details of support systems for all components of the treatment facility.
4. Fencing and signage as appropriate for safety purposes.
5. Required tests to determine the effectiveness of the waste treatment as appropriate.
6. Other plans to manage the system including a nutrient management plan for proper land application of byproducts.

OPERATION AND MAINTENANCE

Develop and review an O&M plan with the owner/operator prior to construction of an innovative waste treatment facility or implementation of an innovative waste treatment process. Ensure the O&M plan is consistent with the proper operation of all system components and contains requirements including but not limited to:

- Recommended loading rates of the waste treatment facility or process for hydraulic and critical pollutant parameters.
- Proper operating procedures for the waste treatment facility or process, including the amount and timing of any chemicals added.
- Operation and maintenance manuals for pumps, blowers, instrumentation and control devices, and other equipment used as components of the waste treatment facility or process.
- Description of the planned startup procedures, normal operation, safety issues, and normal maintenance items. This includes procedures for the planned replacement of components with less than a ten year service life.
- Alternative operation procedures in the event of equipment failure.
- Troubleshooting guide
- Monitoring and reporting plan designed to demonstrate system performance on an ongoing basis
- The service life of each component as identified by the manufacture of service provider. The minimum service life for the waste treatment facility or process is ten years. Where components have less than a ten year service life, clearly identify their planned replacement schedule.

Additional O&M Requirements for Milkhouse Wastewater Infiltration Areas

- Settling basin and grease traps shall be monitored regularly and periodically cleaned out as required. Proper disposal shall be in a waste storage facility, land application or other acceptable means.
- Shields and other safety features shall be installed and maintained on pumps as per manufacturer.

- Vent pipes for covered tanks shall be kept clear of obstructions.
- Safety precautions shall be exercised prior to entering confined spaces which may contain asphyxiating gases (i.e. self-contained breathing apparatus, proper ventilation, etc.).
- Maintain adequate vegetative cover on the disposal field and adjacent areas.
- Repair of damage to any earthfills, fences, pipes, and other appurtenances.
- Maintain lids and openings to underground structures to ensure year-round access.
- Maintain grates on drains and subsurface drainage systems to ensure they are functional.
- Ensure waste milk is not dumped into the treatment system.
- Strongly consider feeding out the first flush of the system to avoid excess fats from entering the system.